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STATINTL

SECOND MONTHLY PROGRESS REPORT

APRIL 1964

MICRODENSITOMETER CAPABILITY AND INTERPRETATION STUDY

This report covers the second month's activities on a program which consists of a study of microdensitometer capability and interpretation techniques. The three objectives of the program are: (1) the establishment of techniques which will enable a microdensitometer operator to use the instrument to its maximum capability and to interpret the data therefrom accurately (the results of this task will be published as a manual); (2) a survey of existing instruments to study the most recent developments in microdensitometry; and (3) a study of the feasibility and effectiveness of various advances in the state-of-the-art.

Each of the three tasks has been continued during the period covered by this report. As of the end of the month, the percentage expenditure to date was 22%.

I. Mensuration Procedures and Data Interpretation

The investigation of applications of microdensitometry has been continued with particular emphasis on such applications as photographic system performance and photographic photometry. A theoretical investigation of the effect of image motion on the value of resolution obtained from edge scans has been initiated. Preliminary data indicate that the value of resolution obtained from the maximum of the slope of an edge trace is not a good measure of image motion.

Progress has been made on the investigation of the influence of the degree of coherence of the illuminating light upon the images of edges and rectangles. The analysis has led to integrals which must be completed by numerical integration. These integrations are being programmed for the digital computer. Graphs of image intensity distribution for narrow rectangles indicate that greater fidelity can

be achieved at the expense of contrast by placing a central stop in the condenser system. There are also indications that for larger objects increased acutance can be obtained by reducing the numerical aperture of the condensing system relative to that of the analytical system. Further analysis will include examination of the influence of the scanning aperture upon the image and consideration of particular examples for the microdensitometer system.

STATINTL The dependence of the measured density value on factors such as source and detector specularity, film processing time, and different films sold under the same trade name [redacted] is being determined for several density values. The following step wedges have been produced:

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Processing
4 min DK-50
5 min D-19
5 min DK-50
8 min D-19
5 min D-19
2 min D-19
12 min D-19
5 min D-19

The wedges are to be scanned using the following optics:

Objective	
Source	Detector
5X	5X
5	10
5	20
10	10

Objective	
Source	Detector
10X	20X
20	20

The detector eyepiece will be 5X for all cases, and the scanning aperture will be as large as convenient so that fluctuations during the scan are minimized.

II. Equipment Capability

Additional replies to the survey are continuing to be received. The results to date are listed in Table I. A follow-up letter has been sent to the companies

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